be described in detail hereunder.

Where the magnetization of the spin valve film is pinned with an Mn-based ferromagnetic layer, for example, as in CoFe/Cu/CoFe/IrMn, the MR characteristics of the film will be greatly degraded if Mn passes through the intergranular boundaries therein to penetrate through the CoFe layer and diffuses even into the Cu layer. Therefore, in the constitution of CoFe/Cu/CoFe/IrMn or the like, it is desirable that Mn is prevented from passing through the intergranular boundaries to diffuse into the Cu layer. On the other hand, since the interface of the magnetic layer not adjacent to the nonmagnetic spacer layer shall be the interface to induce specular reflection, the microstructure of the spin valve film is preferably such that the interface of the magnetic layer is difficult to disorder. For this, it is important that the material of the layer positioned outside of the ferromagnetic layer does not form solid solution with the essential constituent element of the magnetic layer.

In the case where the antiferromagnetic layer is of IrMn or the like in which the lattice spacing greatly differs from that in CoFe, significant lattice distortion occurs between the CoFe layer and the overlying IrMn layer. If so, atomic dislocation will occur in the interface of CoFe/IrMn to relieve the lattice distortion therein. For preventing such an unfavorable interfacial phenomenon, for example, an

additional layer capable of stabilizing the lattice spacing in IrMn may be disposed on the IrMn layer. For the additional layer, for example, an fcc metal material in which the lattice spacing is nearly on the same level as in IrMn may be laminated over the IrMn layer. With that constitution, the thermal stability of the spin valve film could be improved.

Where the MR-improving layer is provided below the antiferromagnetic layer as the underlayer for the antiferromagnetic layer, it will be effective for controlling the lattice spacing in the antiferromagnetic layer and, in addition, for enhancing the pinning ability of the antiferromagnetic layer. Even to that case where the MR-improving layer is provided directly adjacent to the antiferromagnetic layer, not only ordinary pinned structures in which the pinned layer is directly contacted with the antiferromagnetic layer but also Synthetic antiferromagnetic structures with Ru, Cr and others such as those mentioned above are applicable. In the combined constitution with the antiferromagnetic layer, the antiferromagnetic layer and the MR-improving layer do not diffuse too much in thermal treatment. Therefore, it is desirable that the material of the MR-improving layer does not form solid solution with that of the antiferromagnetic layer, or, when an γ -Mn-based antiferromagnetic material such as IrMn, RuRhMn or the like is used for the antiferromagnetic layer, the MR-improving layer

is of an fcc metal material or an hcp metal material so as to stably keep the crystal structure of the antiferromagnetic layer.

Based on various advantages of specular reflection on the interface of metal film/metal film and others mentioned above, the magnetoresistance effect device of the invention is intended to have improved MR characteristics, improved thermal stability and improved magnetization-pinning characteristics. For that device with specular reflection on the metal/metal interface therein, the following two points must be taken into consideration. First, since there is small potential difference in the metal/metal interface, the interface could not ensure large specular reflection if based on the conventional idea. Secondly, when the film thickness is increased to some degree in order to ensure the specular reflection effect of the reflective film of a metal, the metal film will produce shunt current flows as having small resistance, whereby the current to flow in the basic GMR unit will decrease and the MR ratio in the device will be reduced.

It is believed that metal films are inferior to oxide films with respect to their reflectivity. Though inferior to oxide films, metal films could still have good reflectivity. From the viewpoint of industrial applicability, metallic reflective films are superior to reflective films of oxides. Based on this point, the invention has been herein completed.